CLAIMS

1. A plastisol formulation, comprising:

a) a plasticizer or mixture of plasticizers; and

b) a mixture of polymer particles comprising at least two components A and B;

c) at least one member selected from the group consisting of fillers, coupling agents, stabilizers, desiccants, rheological additives, hollow bodies and mixtures thereof;

wherein said polymer particles comprising at least two components A and B have one of the following structures

ba) a 2-stage structure, a 3-stage structure or multi-stage structure, or

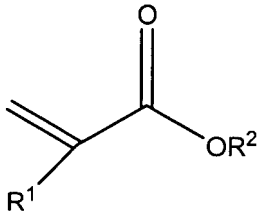
bb) a gradient polymer structure.

2. The plastisol formulation according to claim 1, wherein said component A comprises a polymer particle obtained by emulsion polymerization, said polymer particle having a core KA, an outermost shell S_1A, a second shell S_2A and a third shell S_3A;

wherein said component B comprises a polymer particle comprising a core KB, an outermost shell S_1B, a second shell S_2B and a third shell S_3B;

wherein said core KA comprises the following monomers in copolymerized form:

K A a) 10 to 50 percent by mass, relative to the core, of (meth)acrylates of Formula I



(I)

wherein

R^1 = H or CH_3; and

R^2 = CH_3 or CH_2CH_3;

K A b) 50 to 90 percent by mass, relative to the core, of compounds of Formula I;

wherein R^1 = H or CH_3, and R^2 is selected from the group consisting of propyl, isopropyl, tert-butyl, n-butyl, isobutyl, pentyl, hexyl, iso-octyl, octyl, cyclohexyl, 2-ethylhexyl, octadecyl, dodecyl, tetradecyl, oleyl, decyl, benzyl, cetyl, isobornyl, neopentyl, cyclopentyl, undecyl, and docosyl;

K A c) 0 to 10 percent by mass, relative to the core, of compounds that can be copolymerized with the monomers KA a) and/or KA b); and

K A d) 0.1 to 9.9 percent by mass of monomers containing an epoxy group;

wherein said outermost shell S_1 A comprises the following monomers in copolymerized form:

S_1 A a) 70 to 100 percent by mass of monomers of Formula I,

wherein

R^1 = H or CH_3, and

R^2 = CH_3 or CH_2CH_3;

S_1 A b) 0 to 30 percent by mass of the monomer of Formula I, wherein the R^1 and R^2 have the meaning indicated for K A b); and

S_1 A c) 0 to 10 percent by mass of a monomer copolymerized with S_1 A a) and S_1 A b);

wherein said second shell S_2 A comprises of the following monomers in copolymerized form:

S_2 A a) 20 to 80 percent by mass of monomers of Formula I, wherein

R^1 = H or CH_3, and

R^2 = CH_3 or CH_2CH_3;

S_2 A b) 20 to 70 percent by mass of the monomer of Formula I, wherein

R^1 = H or CH_3, and

R^2 has the same meanings as for K A b); and

S_2 A c) 0.1 to 9.9 percent by mass of monomers containing an epoxy group;

wherein said third shell S_3 A comprises the following monomers in copolymerized form:

S_3 A a) 30 to 100 percent by mass of monomers of Formula I, wherein:

R^1 = H or CH_3, and

R^2 = CH_3 or CH_2CH_3;

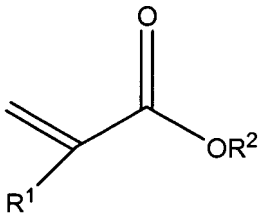
S_3 A b) 0 to 70 percent by mass of the monomer of Formula I, wherein:

R^1 = H or CH_3, and R^2 has the same meanings as for K A b); and

S_3 A c) 0 to 10 percent by mass of a monomer that can be copolymerized with S_1A) to S_1A), the monomers having the meanings indicated for K A c);

wherein said core KB comprises the following monomers in copolymerized form:

K B a) 10 to 50 percent by mass, relative to the core, of (meth)acrylates Formula I



(I)

wherein

R^1 = H or CH_3; and

R^2 = CH_3 or CH_2CH_3;

K B b) 50 to 90 percent by mass, relative to the core, of compounds of Formula I, wherein R^1 and R^2 have the meanings indicated for K A b);

K B c) 0 to 10 percent by mass, relative to the core, of compounds copolymerizable with the monomers KB a) and/or KB b); and

K B d) 0.1 to 9.9 percent by mass of monomers that contain nucleophilic groups,

S_1 B a) 70 to 100 percent by mass of monomers of Formula I, wherein:

R^1 =H or CH_3, and

R^2 = CH_3 or CH_2CH_3;

S_1 B b) 0 to 30 percent by mass of the monomer of Formula I, wherein:

R^1 and R^2 have the meaning indicated for K A b);

S_1 B c) 0 to 10 percent by mass of a monomer copolymerizable with S_1 B a) and/or S_1 B b); and

S_1 B d) 0.1 to 9.9 percent by mass of monomers that contain nucleophilic groups;

wherein said second shell S_2 B of polymer B comprises the following monomers in copolymerized form:

S_2 B a) 20 to 80 percent by mass of monomers of Formula I, wherein:

R^1 =H or CH_3, and

R^2 = CH_3 or CH_2CH_3;

S_2 B b) 20 to 70 percent by mass of the monomer of Formula I, wherein:

R^1 =H or CH_3, and R^2 has the same meanings as for K B b); and

S_2 B c) 0.1 to 9.9 percent by mass of monomers that are capable of a nucleophilic reaction with the epoxide-containing monomer of polymer A;

wherein said third shell S_3B comprises of the following monomers in copolymerized form:

S_3 B a) 30 to 90 percent by mass of monomers of Formula I, wherein:

R^1 =H or CH_3, and

R^2 = CH_3 or CH_2CH_3;

S_3 B b) 10 to 70 percent by mass of the monomer of Formula I, wherein:

R^1 =H or CH_3, and R^2 has the same meanings as for K B b);

S_3 B c) 0 to 10 percent by mass of a monomer copolymerizable with S_1B a) and/or S_1B b), the monomers having the meanings indicated for K A c); and

S_3 B d) 0.1 to 9.9 percent by mass of monomers that contain nucleophilic groups.

3. The plastisol formulation according to claim 1, wherein a mixing ratio of components A and B ranges between 100:0 and 20:80 parts by weight.

4. The plastisol formulation according to claim 1, wherein a mixing ratios relative to the total mass of the component A have the following values:

(K A) 20 to 90 percent by mass,

(S_1A) 10 to 80 percent by mass,

(S_2A) 0 to 70 percent by mass, and

(S_3A) 0 to 70 percent by mass.

5. The plastisol formulation according to claim 1, wherein a mixing ratio relative to the total mass of the component B has the following values:

(K B) 20 to 100 percent by mass,

(S_1B) 0 to 80 percent by mass,

(S_2B) 0 to 70 percent by mass, and

(S_3B) 0 to 70 percent by mass.

6. The plastisol formulation according to claim 1, wherein said component A represents a gradient polymer, wherein the proportions by mass relative to the polymer A are as follows:

(K A) 0 to 90 percent by mass, and

(S A) 10 to 100 percent by mass.

7. The plastisol formulation according to claim 1, wherein said component B

represents a gradient type, wherein the proportions by mass relative to the polymer B are as follows:

(K B) 0 to 90 percent by mass,

(S B) 10 to 100 percent by mass.

8. A method for coating of a metal sheet, comprising:

contacting a metal sheet with the plastisol according to claim 1.

9. A metal sheet coated with a plastisol formulation according to claim 1.

10. A vehicle, at least partly coated with a plastisol formulation according to claim 1.

11. A method for underbody protection of vehicles, comprising:

contacting a underbody of a vehicle with the plastisol formulation according to claim 1.